

## POSTER SESSION

1080

# Percutaneous Coronary Intervention for Chronic Total Occlusion: Intracoronary Brachytherapy

Monday, March 08, 2004, Noon-2:00 p.m.

Morial Convention Center, Hall G

Presentation Hour: 1:00 p.m.-2:00 p.m.

1080-41

## Porcine Model of Atherothrombotic Chronic Total Occlusion

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**Background:** Chronic total occlusions (CTO) are a significant problem identifying patients at increased risk of death and myocardial infarction. Currently, There are no reproducible animal models for evaluation of new percutaneous devices in the treatment of CTO. We proposed a novel model of CTO mimicking human fiberoatheroma. This model could be used to understand the unique properties of fibrous CTO as well as a new develop new devices.

**Methods:** Ten common swine (Sous Scroufulae) were intubated and underwent selective coronary artery catheterization. After selective engagement of either the right or circumflex coronary artery, an introducer sheath was advanced into the mid segment of the artery. A proprietary L-LPPA 3-d microporous bioabsorbable polymer cylinder (PC) was placed using a solid introducer. This polymer allows limited antegrade flow to occur resulting in gradual occlusion of the artery over hours or days. The bioabsorbable polymer is designed to be completely absorbed by 28 days with replacement of the polymer by a dense fibrotic plaque.

**Results:** PC were successfully delivered to all ten animals. One animal, who received a proximal PC delivery died from an acute anterior wall myocardial infarction. The remaining 9 animals underwent repeat angiography with intravascular ultrasound at 10 days. One of the 9 animals had spontaneous recanalization at the PC implant site from bridging collaterals. The remaining 8 animals had complete occlusion of the vessel distal to the PC without collateral formation. Once the total occlusion was crossed, intravascular ultrasound imaging was performed using a mechanical imaging system (CVIS). After imaging the animal was euthanized and the artery segment dissected. The histopathology demonstrated a fibrotic occlusion with minimal residual polymer and no calcification.

**Conclusion:** 1. We present a new porcine model for fibrous CTO in the coronary arteries that allows reproducible occlusion at an early time point. 2. This model mimics human non calcified occlusive atheroma. 3. This model may allow the development of new techniques and devices for treatment of CTO

1080-42

## Resting 12-Lead Electrocardiogram as a Reliable Predictor of Functional Recovery After Recanalization of Chronic Total Coronary Occlusions

Ralf Surber, Philipp Bahrmann, Gero Schwarz, Gerald S. Werner, Friedrich Schiller University, Jena, Germany

**Background:** In coronary artery disease with impaired left ventricular function nuclear imaging techniques are extensively used to predict viable tissue with a sensitivity of 81% to 93%, but lower specificity of 58% to 66%. We evaluated a classic diagnostic modality, the resting ECG, for prediction of functional recovery after recanalization of chronic total coronary occlusions (CTO).

**Methods:** A consecutive series of 62 patients (pts) with impaired left ventricular function due to a CTO of either the right coronary artery (RCA) or left anterior descendens (LAD) and successful recanalization were studied. The regional wall motion severity index (WMSI) was assessed by the centerline method before recanalization and at follow-up (5±1.4 months). The resting 12-lead ECG prior to recanalization was analyzed for Q waves in the region of the recanalized coronary artery. In addition, the Selvester complete QRS score (SS) and parameters of QT dispersion were calculated. Patients with bundle branch block or paced rhythm were excluded from the analysis. Angiography revealed reocclusion at follow-up in 6 pts and therefore they were also excluded from the final analysis.

**Results:** The SS in the baseline ECG was significantly correlated to subsequent improvement in WMSI (p=0.01). Improvement in WMSI greater 1 SD/chord occurred in 44% of pts. Absence of Q waves in the region of the recanalized artery predicted improvement with 89% sensitivity and 67% specificity. A concordant QRS-T wave pattern in patients without Q waves had a 83% specificity for improvement in regional wall motion. In a multivariate regression model, including clinical and ECG parameters, only absence of Q waves in the region of the recanalized artery predicted regional recovery of wall motion (p=0.003). On the other hand, Q waves in the recanalized region were highly predictive for non-recovery (positive predictive value 89%).

**Conclusion:** Improvement in regional wall motion after successful recanalization of CTO's is predicted by resting 12-lead ECG with a sensitivity and specificity comparable to costly and time-consuming nuclear imaging techniques. Q waves in a region of a CTO are specific for tissue without contractile recovery.

1080-43

## Successful Percutaneous Revascularization of Chronic Total Occlusions Is Associated With a Significant Survival Benefit in Nondiabetics

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**Background:** Registry data suggest that successful percutaneous revascularization of chronic total occlusions (CTOs) is associated with a survival benefit. Data from BARI and other trials suggest that diabetics derive a survival benefit from surgical over percutaneous revascularization.

**Methods:** We evaluated the interaction of diabetic status and successful revascularization of CTOs on survival in a large single center registry. A total of 899 patients underwent attempt at percutaneous coronary intervention (PCI) of CTOs at our institution over a 10-year period. Long-term follow up was obtained using the social security death index. Patients were divided into non-diabetics, non-insulin requiring diabetics and insulin requiring diabetics. The mean follow up was 4.3 years

**Results:** The mean age of the cohort was 62 years with 75% (678) being men. There were 622 non-diabetics, 165 non-insulin-requiring diabetics and 112 insulin-requiring diabetics. Among the non-diabetics the procedure was a success in 316 and of these 28 (8.9%) died on follow up in comparison to 49 (16%) of the 306 in whom the procedure was unsuccessful (P = 0.007). Among the non-insulin requiring diabetics the mortality among the 86 patients with a successful procedure was 13 (15.1%) compared to 17 among the 79 (21.5%) with an unsuccessful procedure (P = 0.32). Among the insulin requiring diabetics the long term mortality was 30.2 % (19/63) among those with a successful procedure and 24.5 % (12/49) among those with an unsuccessful procedure (P = 0.53).

**Conclusion:** Successful PCI of CTOs is associated with a survival advantage in non-diabetics and a trend towards improved survival in non-insulin requiring diabetics while no improvement in outcome of insulin dependent diabetics is seen.

1080-44

## Preliminary Experience With the Front Runner Coronary Catheter, Novel Device Dedicated to Mechanical Revascularization of Chronic Total Occlusions

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**Background.** The novel device, the Frontrunner Coronary Catheter (FCC), dedicated to mechanical recanalization of CTO, relies on blunt microdissections inside the plaque allowing passage of guidewire through the plaque and adjunctive angioplasty. In this study we evaluated procedural and clinical success, and safety of recanalization using the FCC device.

**ethods.** The study included patients with de novo or restenotic CTO located in a native coronary artery who failed a prior attempt with a mechanical guidewire (hydrophilic wires or CTO dedicated wires) and patients with an occlusion considered unsuitable for guidewire attempt

**Results.** Between October 2000 and June 2003, 50 patients with 50 CTO were included in the study. The median age of occlusion was 8.7 months: 10 months (3.2 to 48 months) according to clinical history and 5.5 months (3 to 108 months) according to prior angiogram. The mean occlusion length was 38.3±22.3 mm. Overall device success was 25 (50%): total device success in 17 (68%) and combined success in the remaining 8 (32%) occlusions. Among the 50 occlusions, mechanical wires were first attempted in 32 (64%) of them (median time 11 minutes, range 5 to 35) and in all these cases without success. Following usage of FCC device (median time 27 minutes, range 10 to 55) angiographic success was achieved in 17 (53%) of these lesions. In 18 occlusions the FCC device was the first attempted device and angiographic success was obtained in 8 (44%) of them. Out of these 8 occlusions total device success was obtained in 6 (75%) and combined success in the remaining 2 (25%) lesions. Coronary perforations occurred in 9 (17.3%) patients leading to tamponade in 2 patients who were treated with pericardiocentesis. Serious adverse events occurred in 8 (15.7%) patients within 30 days follow-up. There were 7 non-Q-wave myocardial infarctions (CK-MB>3x above upper normal limit) and one sudden death seven days after the index procedure.

**Conclusions.** The use of FCC can help to increase the success to reopen total occlusions which failed a mechanical wire or which are considered unsuitable for an attempt. The risk of perforation due to wire or to FCC device is relatively high and it may decrease with experience.

1080-45

## Temporal Trends in the Treatment of Total Coronary Occlusions

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**Background:** Success rates for treatment of totally occluded (TO) coronary arteries have been lower than for arteries with less severe lesions. Whether refinements in techniques and equipment now available have improved the outcomes of TO intervention is unknown.

**Methods:** From the 1985-86 NHLBI PTCA Registry and the current NHLBI Dynamic Registry (1997-2001), we assessed relative prevalence and success rates in treating TO lesions (≥99% stenosis, TIMI 0 flow) in consecutive TO patients (pts) with (n=563) and without (n=453) acute myocardial infarction (AMI).

**Results:** The prevalence of TO lesions attempted in AMI pts decreased over time from 40% in the 1985-86 Registry to 33%, 25%, 21% in sequential Waves 1-3 of the Dynamic Registry, respectively (P<0.0001). Similarly findings were observed among non-AMI pts, from 14% in the 1985-86 Registry to 8%, 6%, 4% in Waves 1-3 of the Dynamic Registry, respectively (P<0.0001). Rates of successful intervention improved in AMI TO pts from 65% in the 1985-86 Registry to 90%, 92%, and 88% in Waves 1-3 of the Dynamic Regis-